REMARKS

Status of the Claims

Upon entry of the amendment above, claims 21, 22, 25, 29-32, 37-39, 41, 42, 51-55, 58, and 72-79 will be pending, claims 73 and 74 being independent.

Summary of the Office Action

Claim 16-72 are rejected under 35 USC §103(a) as being unpatentable over TAKAMOTO et al. (U.S. Patent No. 5,665,295, hereinafter "TAKAMOTO").

Although claims 58-66 are included in the identification of rejected claims in the body of the Office action, the cover sheet (form PTOL-326) thereof identifies claims 58-66 as being withdrawn from consideration.

Response to the Office Action

A. Summary of the Amendment

In the amendment above, for the purpose of simplifying issues and advancing prosecution of the instant application, Applicants have reduced the total number of claims from 57 to 26 and they have reduced the number of independent claims from three to two.

Independent claim 16 has been canceled and replaced with new independent claim 73, which includes the limitations of dependent claims 16, 17, and 20.

Independent claim 74 includes limitations similar to those that had been presented in former independent claim 68 and dependent claims 17, 20, and 45.

At least for the reasons that follow, which include reasons that have been previously presented but not yet responded to in an Office action, reconsideration and withdrawal of the rejection are kindly requested.

B. Request for Withdrawal of Rejection Based Upon TAKAMOTO

1. TAKAMOTO Fails to Disclose a Fiber Composite Core; the Rejection Fails to Address Applicants' Prior Arguments

In rejected independent claim 16, as well as in new independent claim 73 (which replaces claim 16), Applicants call for, *inter alia*, a laminate having a thickness of no greater than 3 millimeters, the laminate comprising a sandwich structure that comprises a core consisting essentially of a fiber-reinforcing composite positioned between two layers of fiber composite outer layers, the fibers of the outer layers having a higher strength than the fibers of the core. Claim 73 additionally calls for a ratio between the thickness of the core and the total thickness of the two layers to be: $e_2 / \frac{e_3+e_4}{2} \leq 5$, with e_2 being the thickness of the core and $e_3 + e_4$ being the thicknesses of the two layers.

As Applicants had explained in their reply to the prior Office action, *TAKAMOTO fails to disclose a fiber composite core of a sandwich structure.*

Applicants submit that the rejection should be withdrawn at least for the aforementioned reason. Further, the current rejection fails to address Applicants' arguments.

More specifically, the first sentence of the statements in support of the rejection (middle of page 2 of the Office action) refers to column 1, lines 1-16, which provides a short summary of TAKAMOTO's invention.

In that summary, TAKAMOTO says nothing about a fiber composite core.

Instead, TAKAMOTO there refers to "a core portion of a porous resin layer having numerous air foams ...."

The core layer of TAKAMOTO's molded composite article is a resin with embedded

particles (*i.e.*, not *fibers*), some of which are compressible. In the detailed description of TAKAMOTO's specification, such as at column 5, lines 60-65, the core is referred to as being composed of "light-weight filler *particles*, having an average particle diameter in the range of 0.01 to 2.0 mm.

Particles are not fibers, particularly in the context of the art of composite materials, to those of ordinary skill in that art. In support of this contention, in their reply to the prior Office action, Applicants had attached the title page, copyright page, and pages 10-11 and 27-28 from Volume 1, entitled "Composites," of *Engineered Materials Handbook*, ASM International, 1987, to which Applicants again direct attention.

On page 10 thereof, "fiber" is defined as "a general term for a filament with a finite length that is at least 100 times its diameter ...."

On page 27, a chapter entitled "Introduction to Composites" explains (see paragraphs 3-5 in the leftmost column) the differences between *fiber*-reinforced composites and *particle*-reinforced composites, some of the latter of which are described "filled" systems. In the fourth paragraph, examples of "particles" are given as spheres, rods, flakes, and other shapes.

As mentioned above, TAKAMOTO itself describes the core of the therein disclosed composite as being composed of light-weight *filler particles* and the particles are referred to as having a diameter, *i.e.*, spherical.

The aforementioned *Engineered Materials Handbook* explains (*i.e.*, in the fourth paragraph) that some "filled" systems can be said to reinforce the matrix material (resin, *e.g.*), although other such systems do not, such as those which employ materials for fire resistance, control of shrinkage, or increased thermal conductivity.

While it appears clear that the core layer of the TAKAMOTO composite is a "filled" system, and while it is quite questionable whether it can be considered to be a particle-reinforced

composite, *it is clearly not a fiber-reinforced composite*, particularly as described by TAKAMOTO in the detailed description, such as beginning at column 5, line 66.

Further, in column 4, lines 9-12, TAKAMOTO characterizes both the core and the layers of his invention, following a brief summary of the process thereof. As to the core, TAKAMOTO characterizes it as a "dense and firm porous resin layer;" as to the outer layers, TAKAMOTO characterizes them as "fiber-reinforced resin layers."

Thus, Applicants submit that if TAKAMOTO were to be interested in forming a "fiber-reinforced core layer" the core layer would have been described as much, *i.e.*, TAKAMOTO's outer layers were so described. *Consequently, based upon TAKAMOTO's own disclosure, one is lead to conclude that TAKAMOTO is not concerned with a fiber-reinforced core.*

Applicants' invention has been disclosed and claimed as a sandwich that comprises higher-strength fiber composite outer layers an a lower-strength, yet fiber-containing, composite core. By contrast, TAKAMOTO discloses a composite molded article that includes two surface layer portions of fiber-reinforced resin and a resin core embedded with particles. *The respective cores are different at least inasmuch as TAKAMOTO shows no concern for employing a core that includes lower-strength fibers.*

In addition to Applicants' claimed invention possessing at least this difference from that which is disclosed by TAKAMOTO, Applicants submit that one skilled in the art would not have been lead by TAKAMOTO, or others, to have replaced the filler particles of the composite there disclosed with fibers. Accordingly, it would not have been obvious to have modified TAKAMOTO's composite in a way that would have resulted in Applicants' invention.

In this regard, one can see from column 3, lines 5-9 of TAKAMOTO that an object of TAKAMOTO's invention was to "provide a process for the production of a composite molded article having a foamed core-sandwich structure, which process is free of any problem caused by the above prior art processes."

And the "above prior art processes" referenced by TAKAMOTO are those of the three patent documents referenced in the "Prior Art" section of TAKAMOTO's specification, all of which utilize particles in the cores of their composites, such as hollow spherical filler particles (see column 1, lines 53-54).

TAKAMOTO's disclosure, then, is quite clearly directed to particle cores, not fiber composite cores. No suggestion is provided by TAKAMOTO to those skilled in the art of composites to consider fiber composite cores.

Accordingly, reconsideration and withdrawal of the rejection for these additional reasons is requested.

2. <u>The Rejection Fails to Address the "Consisting Essentially" Limitation</u>

Independent claim 73 and claim 79, which depends from independent claim 74, make use of the transition phrase "consisting essentially of" in connection with the composition of the core of their claimed sandwich laminate structure. Specifically, in claim 73 Applicants recite "a core *consisting essentially of* a fiber-reinforced composite material" and, in independent claim 74, Applicants call for a "composite comprising a polymer resin matrix reinforced with fibers," with dependent claim 79 further specifying that "said core consists essentially of said composite."

Thus claims 73 and 79 specifically rule out an important constituent material of TAKAMOTO's core, *viz.*, ***particles*** embedded in the resin thereof (as mentioned at column 5, lines 60-65, *i.e.*, "light-weight filler *particles*").

The Office action fails to address this issue.

Accordingly, reconsideration and withdrawal of the rejection for this additional reasons is requested.

Applicants submit that, in considering the merits of a rejection based upon §103, the rejection should rest on a factual basis, with the facts being interpreted without a hindsight reconstruction of the invention from the prior art. In making this interpretation, the Office has

an initial burden in supplying the factual basis for the rejection that is advanced. Because of a doubt that the invention is patentable, the Office may not resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967). *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Further, concerning the comment in the rejection that the claimed subject matter would have been obvious in the absence of unexpected results (further explained below and in Applicants' prior reply), unexpected results is not a requirement of patentability. *See W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1556, 220 USPQ 303, 315 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (U.S.).

3. Unexpected Results

Applicants' claimed invention provides unexpected results even if one were to find it necessary in concluding their invention to have been non-obvious.

For example, as mentioned in paragraph 0014 of their specification, Applicants have created a sandwich composite (*i.e.*, "sandwich" as understood by those skilled in the art of composites) in which the core of the sandwich can include reinforcing fibers while not adversely affecting the mechanical properties of the composite.

This contrasts with known composites, such as those described in Applicants' background section of their specification, which include those having rigidities that are too substantial to be used for certain products such as sports equipment and boots, where a certain amount of longitudinal deformability would be advantageous, as Applicants explain in paragraph 0007 of their specification.

In addition to the foregoing comments which are directed to the rejection in its entirety, Applicants respectfully take issue with certain comments in the rejection which are directed to particular ones of the dependent claims.

In this regard, the rejection includes the comment "Concerning claims 17, 18, 20-22, the

cited reference teaches the claimed dimension in col. 2, lines 17-27."

As mentioned above, independent claim 73 includes subject matter similar to that in the combination of claims 16, 17, and 20, and independent claim 74 includes similar limitations. Accordingly, in independent claim 73 a limitation is presented that relates to the total thickness of the claimed laminate (less than or equal to 3 mm) as well as to a ratio of the thickness of the *core* vis-à-vis the two layers.

Regarding Applicants' claimed thickness of the laminate of the invention, column 2, lines 17-27 of TAKAMOTO (which describes certain prior art) describes *a total thickness of a molded article* to be "5.8 mm" (which, Applicants also submit, is substantially outside the range of claims 73 and 74).

Also, column 2, lines 17-27 do not appear to relate at all to the subject matter of the aforementioned ratio of thicknesses.

Similarly, the rejection includes the comment "Concerning claims 23-31, 34-41, the cited reference teaches the claimed limitations in col. 4, lines 32-55."

Of claims 23-31, claims 25 and 29-31 are presently pending. These claims are directed to specific characteristics of the *core*. By contrast, column 4, lines 32-55 of TAKAMOTO appears to be directed to a description of the reinforcing fibrous sheets and not to the core. Accordingly, it would appear that the subject matter of claims 25, 29-31 has not been effectively addressed in the rejection.

Accordingly, reconsideration and withdrawal of the rejection for these additional reasons is requested.

4. <u>TAKAMOTO Fails to Disclose a Multi-Ply Core</u>

The rejection makes reference to a number of passages of TAKAMOTO as allegedly disclosing the subject matter of Applicants' claims 51-53 (which refer to the core comprising "a plurality of superimposed plies of composite material", *etc.*).

TAKAMOTO does not disclose a multi-ply core.

In spite of the foregoing arguments in support of their position that the rejection based upon TAKAMOTO should be withdrawn, Applicants have reviewed the entire disclosure of TAKAMOTO and further note the following, although Applicants submit that TAKAMOTO fails to teach or suggest their invention.

Column 8, lines 5-29 and the corresponding descriptions of Examples 11 and 12 (starting in column 24) of TAKAMOTO explain that the composite core can be reinforced *locally* by a diverse type of reinforcement.

It is important to understand that such reinforcements are in fact "self-standing" composite structures embedded within the resin-particles compound.

Therefore, this proposal of a reinforced core renders the core very heterogeneous. Even though a composite, by definition, is a heterogeneous material, here the core becomes heterogeneous on a macroscopic level. So, even though TAKAMOTO indicates that some materials are usable as reinforcements, such as polyester, polyamide, and cellulose (column 8, line 18), which are also suitable as core fibers in Applicants' invention, TAKAMOTO does not teach the use of fibers of lesser mechanical strength than those of the skins (*i.e.*, outer layers). Indeed, in Example 11, the reinforced ribs are made with glass fiber powder (*i.e.*, particles --- *not* fibers) and, in Example 12, they are made of 6 mm diameter braided glass-fiber strands. In both cases, the material used as reinforcement for the core is glass, the same as that for the skin layers.

SUMMARY AND CONCLUSION

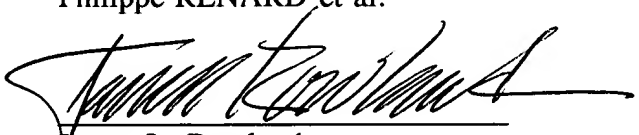
Allowance of the instant application is kindly requested in view of the amendment and explanation presented above, which are believed to address and resolve issues raised in connection with the sole ground of rejection. Accordingly, reconsideration and withdrawal of the rejection is requested.

A check is enclosed for payment of a fee for an extension of time. No additional fee is believed to be due at this time. However, the Commissioner is authorized to charge any fee required for acceptance of this reply as timely and complete to Deposit Account No. 19-0089.

Further, although an extension of time for a single month is believed to be necessary at this time, if it were to be found that an additional extension of time were necessary to render this reply timely and/or complete, Applicants request an extension of time under 37 CFR §1.136(a) in the necessary increment(s) of month(s) to render this reply timely and/or complete and the Commissioner is authorized to charge any necessary extension of time fee under 37 CFR §1.17 to Deposit Account No. 19-0089.

Any comments or questions concerning this application can be directed to the undersigned at the telephone or fax number given below.

Respectfully submitted,
Philippe RENARD et al.



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